

can scarcely refrain from saying that in the second part of the work the author seems to have gone out of his way to ignore some of the most peculiar, and therefore the most instructive, types of reptile and fish life.

As regards Part iii., which deals with invertebrates, we feel ourselves less qualified to speak authoritatively either in respect to the excellence of treatment or the reverse on the part of the author, and therefore refrain from detailed criticism. So far, however, as we can judge, the classification adopted is, in some respects, less open to objection than is that of the vertebrates. Even here, however, the author gives opportunity for criticism in many places. For example, among the molluscs no mention is made of Dentalium, which most modern zoologists regard as the representative of an order by itself. And it is scarcely consonant with the facts to say (p. 445) that Ammonites "were animals similar to the nautilus in all essentials of form and structure," unless, indeed, the author attaches a very different meaning to the word "essential" than we are disposed to assign to it. But the most astounding feature in the whole book is the total omission of the Brachiopods, the Tunicates, and the Polyzoans!

At the end of the work two pages are devoted to geographical distribution. Here it will surprise many zoologists to find the domesticated zebu given as one of the characteristic animals of the Indian region, and "the antelope" as one of those of Africa. Neither is it apparent why the leopard and the panther are included among the characteristic mammals of Africa as distinct from India. Again, the statement (p. 485) that "tracts of land (e.g. the Sahara) have been elevated out of the ocean" may be cited as an extremely unfortunate one, having regard to modern views as to the origin of deserts.

If the editor in his preface is justified in his statement that "the book is far superior in many respects to any other elementary text-book of the subject known to me," we may be permitted to add that in other respects it is decidedly inferior to several works of the like nature that could be named.

R. L.

OUR BOOK SHELF.

The Mycetozoa and some Questions which they Suggest.

By the Right Hon. Sir Edward Fry, D.C.L., LL.D., F.R.S., F.L.S., and Agnes Fry. Pp. viii + 82. (London: Knowledge Office, 1899.)

"WHAT'S in a name?" Much, when it bars the way to the knowledge of a group so rich in curious and beautiful forms, and so important in the information that it can afford upon the nature of protoplasm. The want of a familiar name has led the authors to employ "myxies," and the word may find acceptance, as it is not hard to pronounce or remember, while it has the advantage of leaving open the question of what their pets are. Though generally reckoned now among plants, they are so different from even the nearest groups that they may well receive a neutral name.

They have formed the subject of very excellent monographs in various languages, and to these the student must turn who wishes to investigate the Mycetozoa thoroughly. But the very excellence of these monographs renders them unsuitable to those that wish only such a general outline as will place the group in true perspective in its relation to other low forms of living

beings, and will indicate its value in the study of living protoplasm in simple organisms. There was room for a small book that would give such an outline, and this little work has been written to do so. One cannot read it without recognising that it is the work of enthusiasts whose aim is to communicate to others the pleasure gained by themselves in the study. But no less evident is the clearness of statement of the points of chief interest resulting from width of view and facility of expression. One can recognise that it is the work of amateurs by occasional slips, as on p. 35, where it is stated that all plants with a square stem and lipped flowers belong to the family of the Labiatae. But such slips are few, and no one can read the book without interest, while those not already familiar with the Mycetozoa will have gained as clear a conception of their nature and scientific interest as can be acquired without actual personal study of these organisms. The descriptions are supplemented by figures admirably selected and executed. The book is one that should induce those who read it to desire a fuller knowledge and to become students themselves. It will be found an excellent introduction to the study of a most interesting group.

A School Chemistry. By Dr. John Waddell. Pp. xiii + 278. (New York: The Macmillan Co., 1900.)

MANY text-books of physics and chemistry are now constructed upon the interrogatory plan. Judiciously used, the method has real educational advantages, for it makes the student think for himself instead of merely using his brain as an absorbing medium for what he reads or is told. But the Socratic principle is often overdone. The questions which a teacher asks—either in book or verbally—in connection with experiments in progress, are frequently not those which present themselves to the mind of the student. True, by suggesting questions the pupil can be led to see the main points to be brought out, and to have an interest in finding answers to them; but the ideal plan is to let his own mind do the questioning instead of the mind of the teacher. While, therefore, we agree that the interrogative method largely employed by Dr. Waddell is often stimulating, and certainly much better than the plan of former text-books for schools, we do not believe it is altogether satisfactory.

Consider a boy in a laboratory, with Dr. Waddell's book open at Experiments 9 and 10 (Chap. ii.). The experiments are on the decomposition of water by potassium and sodium, and will often result in accidents unless performed under the eye of the teacher. But leaving this out of account, let us see the questions asked in the course of the description of Experiment 10; they are as follows: "Does the potassium sink in the water, or does it float? What colour has the flame? . . . What shape does the sodium assume? Note how far it acts like potassium, and how far it differs. Is there a flame? Try the experiment with *hot* water. . . . Why is there a flame in some cases with the sodium and not with others? What is the colour of the flame? Does sodium or potassium act the more violently on water?" Now a question we would ask is: How is the pupil to give his answers? Is he supposed to write a reply to each interrogation, or merely to make a mental note of it? If the former, then the pupil must soon get weary of the obstacles offered to the progress of his practical work by the everlasting questions prompted, not by his own curiosity, but by a book. In fact, we do not believe it is possible to carry out the Socratic method of science instruction successfully by means of a text-book. The spirit of inquiry must come from within, or be inspired by a teacher watching the progress of an experiment.

It must not, however, be concluded from the foregoing that Dr. Waddell's book is destitute of the elements of

success. He does not use the plan of questioning to the excess characteristic of some other authors of recent textbooks of chemistry; and his book has some special features which make it worth adoption in elementary classes in schools and colleges. The intelligent order in which the subjects are dealt with, and the attention given to industrial processes, are particularly worthy of credit.

Die Photographie im Dienste der Himmelskunde. Von Dr. Karl Kestersitz. Pp. 53. (Wien: Carl Gerold's Sohn, 1900.)

THIS short monograph is a reprint of a lecture given by Dr. Kestersitz before the Vienna Photographic Society. The author describes in a somewhat general way the results that have been obtained by applying the camera to the end of a telescope and turning it towards the heavens. We are thus introduced to the appearance of the general features of the sun in and out of an eclipse, and a brief reference to the planets and asteroids as shown us by photography. Meteor photography is more fully described, and the author here gives two illustrations showing trails as photographed by him. The method of determining the relative brightness of stars by photographing them slightly out of focus is described, and a few words are written about the photography of the Milky Way. The illustrations, which are numerous and good, are chiefly from Scheiner's "Photographie der Gestirne," there being two excellent heliogravures showing the nebula of Orion and Barnard's Milky Way.

The last portion of the book is devoted to the publication of twelve replies that were received from different authorities in answer to a suggestion, proposed by the author, of erecting an observatory on the top of the "Schneeberg." These form interesting reading, although they hardly have any connection with the subject-matter of the book itself.

Although the monograph does not pretend to be complete, yet it gives the reader an idea of the important part played by photography in astronomy.

Die Säkular-Verlegung der Magnetischen Axe der Erde. Von W. van Bemmelen. (Observations made at the Royal Magnetical and Meteorological Observatory at Batavia.) Vol. xxii. Appendix i. Pp. 30.

THIS is an attempt to trace the position of the earth's magnetic axis during the last three centuries, on the supposition that a knowledge of magnetic declination is sufficient to determine the direction of its axis. Great circles drawn through different points, and coincident at these points with the magnetic meridians, would intersect in the poles of the magnetic axis, if the earth were a uniformly magnetised sphere. As this is not the case, the circles all pass through an arctic and an antarctic region instead of through two points, and Mr. van Bemmelen calculates by the method of least squares the point in each region which is nearest to the circles. The two points thus found he takes for the intersections of the magnetic axis with the earth's surface. The reader must be referred to the original for the clever manner in which the calculations are simplified and carried out. The method is first tested for the year 1885, when it is found that the magnetic axis, calculated in this fashion, agrees closely with that derived from the more rigorous analysis of Neumayer and Ad. Schmidt. It is then applied to the declination values for the years 1600, 1650, 1750, 1770 and 1842, and the author draws from the results thus obtained the conclusion that the magnetic axis does not revolve round the geographical axis, but that there seems to be a tendency to revolve round Nordenskjöld's aurora pole. A doubt must necessarily arise in the mind of the reader as to how far the older observations are sufficiently numerous and correct to allow any certain conclusions to be drawn from them. Any one looking at Neumayer's Atlas (Berghaus) of Terrestrial Magnetism

will be struck at once by the fact that the distribution of magnetic declination in the year 1600 is represented as being widely different from that of a uniformly magnetised sphere. We must conclude that either the observations were not sufficiently accurate to give us a correct picture, or that the earth differed much more from a uniformly magnetised sphere at that time than it does now. As v. Bemmelen has only tested his method at a time when the deviations from uniformity were small, there is considerable doubt whether equally good results would be obtained with irregular magnetisation. The work, meritorious and interesting as it is, cannot, therefore, be said to have led to any conclusion which can be accepted without further evidence.

The Theory of Commutation. By C. C. Hawkins. Pp. 81. (London: J. Tucker, no date.) Price 2s. 6d.

IN this pamphlet Mr. Hawkins enters into a complete mathematical investigation of the reactions occurring during the process of commutation in continuous current dynamos. The author first examines the case in which the contact resistance of the brushes is neglected, and then proceeds to give a complete solution of the equation for the current in the short-circuited coil, taking into account this resistance. This solution is due to Prof. Arnold and Dr. G. Mie, but our thanks are due to Mr. Hawkins for introducing it into England and for pointing out its practical bearings. Mr. Hawkins shows that the contact resistance is of the greatest importance in preventing sparking; the employment of carbon as the material of the brushes is consequently desirable, since the contact resistance of carbon is about fifteen times that of copper. Allowing for the fact that the surface needed to collect the same current must be about five times as great with carbon as with copper, the carbon brushes are still, approximately, three times as good as copper. The author also points out the other considerations affecting sparking, and goes fully into the question how it may be best avoided, both in dynamos and motors. The mathematical investigation is made clearer by the application of the results to a practical case, and by a careful explanation of the physical interpretation of the equations.

Album of Papua. Types II. North New Guinea, Bismarck Archipelago, German Salomon Islands. By Dr. A. B. Meyer and R. Parkinson. About 550 figures on 53 plates in heliotype. (Dresden: Stengel and Co., 1900.) Price 50s.

THROUGH the energy and skill of Mr. Parkinson, Dr. Meyer has been enabled to publish a second album of photographs illustrating Melanesian ethnology. The present album supplements the first one, which was published in 1894, and is now out of print. The photographs are well taken, and give us instructive glimpses of native life. The short explanation of each plate is printed in German and English, and these little accounts frequently contain notes of great interest, and there are helpful references to previous publications. There is a photograph (pl. xxiii. 2) of a girl playing the "pangolo." In his admirable memoir on "The Natural History of the Musical Bow," Mr. H. Balfour gives an account of the playing of this interesting musical instrument, which differs from that described by Meyer and Parkinson, the original account of the pangolo, by Dr. O. Finsch, being insufficient. Mr. Balfour evidently read into Finsch's figure more than it was intended to convey.

Albums such as these are of very great service to students at home, as good illustrations are much more readily grasped than are long verbal descriptions, and we hope that other albums will follow in due course. This is not the first time that Mr. Parkinson's labours in ethnology have been recognised in NATURE, and we only wish that some of our British residents and traders